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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
08/602,503	02/20/1996	MICHAEL B. BALL	2718US	4539

7590 09/24/2003

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EXAMINER

NGUYEN, DILINH P

ART UNIT PAPER NUMBER

2814

DATE MAILED: 09/24/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

08/602,503

Applicant(s)

BALL, MICHAEL B.

Examiner

DiLinh Nguyen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 September 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 19,21-23 and 25-34 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 19,21-23 and 25-34 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yamauchi (JP.Pat. 5-13665) in view of Schonhorn et al. (U.S. Pat. 4377619)

Yamauchi discloses a method of fabricating a multi-die assembly (Fig. 1, abstract) comprising:

providing a substrate 1 including a plurality of conductors 3;

attaching at least one active face down base die to the substrate in electrical communication with at least some of the plurality of conductors;

providing a layer of adhesive to a back side of the at least one base die;

placing a back side of at least one active face up stack die on the layer of adhesive;

securing the back side of at least one stack die to the at least one base die;

providing a direct electrical path between the at least one stack die and at least one of the plurality of conductors, and electrically grounding at least one base die via the adhesive and at least one stack die.

Yamauchi fails to disclose the adhesive is the conductive epoxy adhesive and curing the layer of conductive epoxy adhesive.

Schönhorn et al. disclose a semiconductor device comprising: a layer of conductive epoxy adhesive on the substrate; placing a chip on the layer conductive epoxy adhesive and curing the layer of conductive epoxy adhesive (cover fig., column 6, lines 1-7). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the device of Yamauchi to prevent metal migration and to secure more firmly the chip to the substrate, as shown by Schönhorn et al.

3. Claims 21-23, 25-29 and 33-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamauchi (JP.Pat. 5-13665) in view of Schönhorn et al. and further in view of Fogal et al. (U.S. Pat. 5323060).

Yamauchi and Schönhorn et al. fail to disclose at least another stack die to the assembly and securing at least one discrete component to at least one of the stack die, the base die and the substrate.

- Regarding claims 23 and 25, Fogal et al. discloses a multi-chip semiconductor (fig. 1, column 2, lines 35 et seq.) comprising: securing at least another stack die 54 to the assembly; and securing the stack die 54 to at least one of the stack die 28 to provide a wire bonding of multichip modules to multichip module substrate.
- Regarding claims 21-22, 26-29 and 33-34, Fogal et al. disclose a multichip module (fig. 5, column 3, lines 43 et seq.) comprising :
 - a discrete component 75 to the substrate 12;
 - a discrete components 76 and 78 to an adhesive layer 77 to an upper uppermost chip 85; and

a bond wires 44a, 44b, and 79-81, wherein the bond wires bonding to the substrate and the chips. Fogal et al. show that discrete components can be added, while it is not specifically pointed out, the discrete component could include a filter (by pass) capacitor (column 3, line 53) which is needed for proper device operation and is not normally formed as part of a chip. It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the device of Yamauchi and Schonhorn et al. to provide additional necessary components.

4. Claims 30-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamauchi (JP.Pat. 5-13665) in view of Schonhorn et al. and Fogal et al. (U.S. Pat. 5323060) and further in view of Rostoker (U.S. Pat. 5399898).

Yamauchi, Schonhorn et al. and Fogal et al. disclose the claimed invention except for not further disclose the face down base die includes attaching at least two active face down base die to the substrate.

Rostoker discloses the attaching at least one active face down base die includes attaching at least two active face down base die 404 and 410 (fig. 4a, column 14, lines 40 et seq.) to the substrate 402 and electrically coupling each of the base die with one of the plurality substrate conductors 408 and 414; and

a bridging 416 at least one stack die between the two base die, the assembly is forming should that none of the dice are arranged face to face and limited overlap.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the device of Yamauchi, Schonhorn et al. and Fogal

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et al. to provide a greater power dissipation and a natural convection cooling channel, as shown by Rostoker.

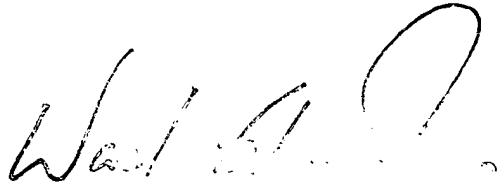
Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DiLinh Nguyen whose telephone number is (703) 305-6983. The examiner can normally be reached on 8:00AM - 6:00PM (M-F).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on (703) 308-4918. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

DLN
September 10, 2003


SUPERVISOR, PRIMARY EXAMINER
TECHNOLOGY CENTER 2600